FIG. 1

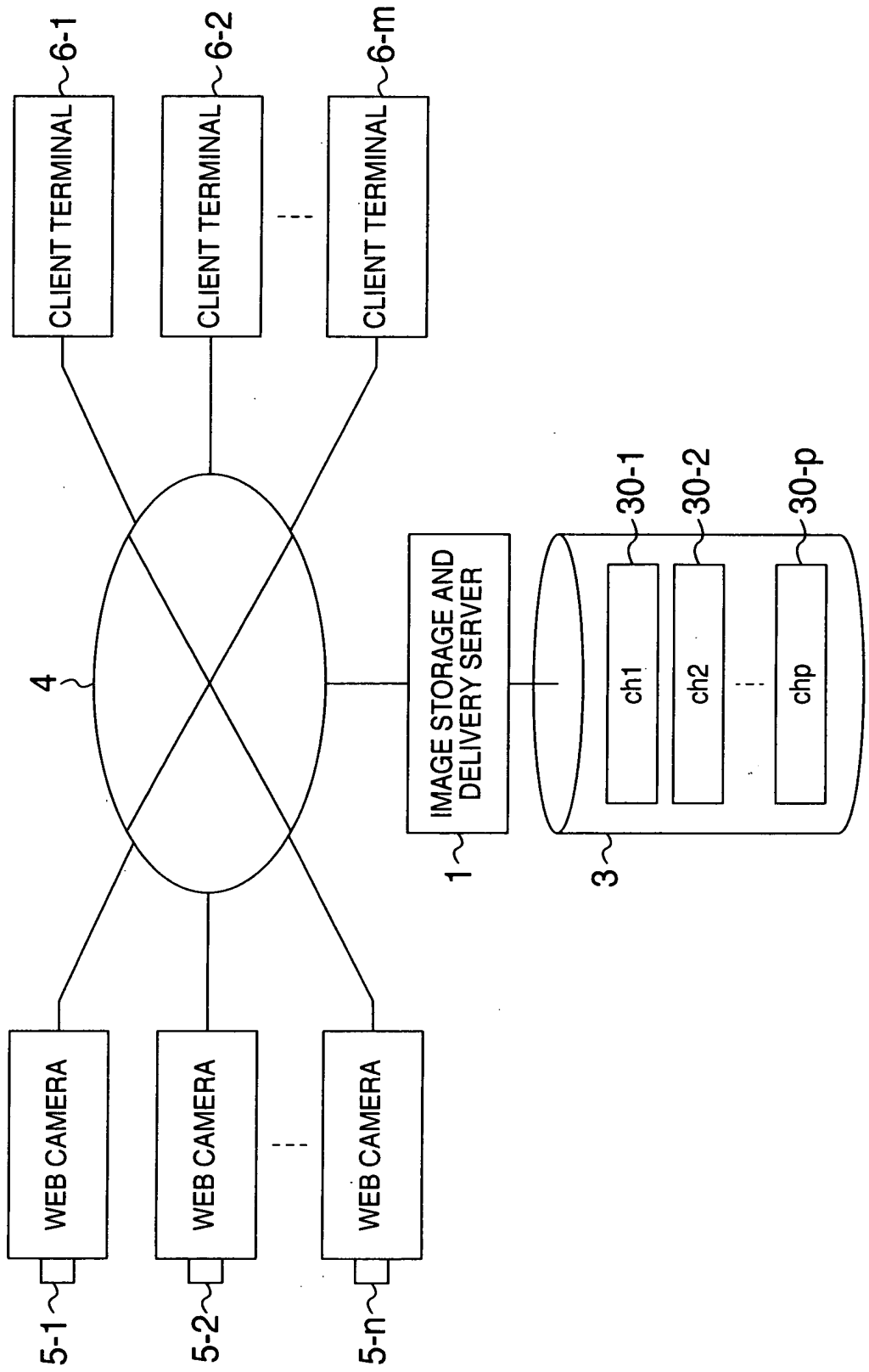

CLIENT TERMINAL
6-1
CLIENT TERMINAL
6-2
CLIENT TERMINAL
6-m
4
IMAGE STORAGE AND DELIVERY SERVER
1
30-1
30-2
30-p
ch1
ch2
chp
3
WEB CAMERA
WEB CAMERA
WEB CAMERA
5-1
5-2
5-n

FIG. 2

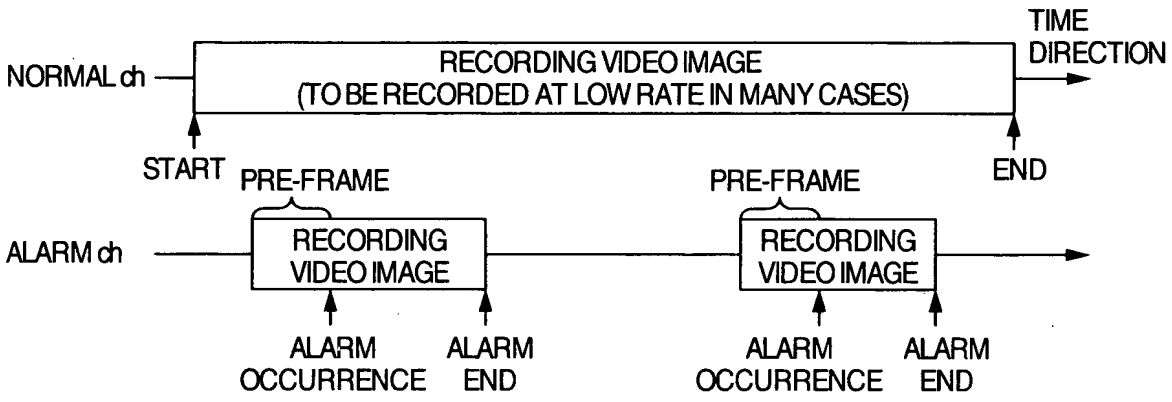

TIME
DIRECTION
NORMAL ch
RECORDING VIDEO IMAGE
(TO BE RECORDED AT LOW RATE IN MANY CASES)
START
END
PRE-FRAME
PRE-FRAME
ALARM ch
RECORDING
VIDEO IMAGE
RECORDING
VIDEO IMAGE
ALARM
OCCURRENCE
ALARM
END
ALARM
OCCURRENCE
ALARM
END

FIG. 3

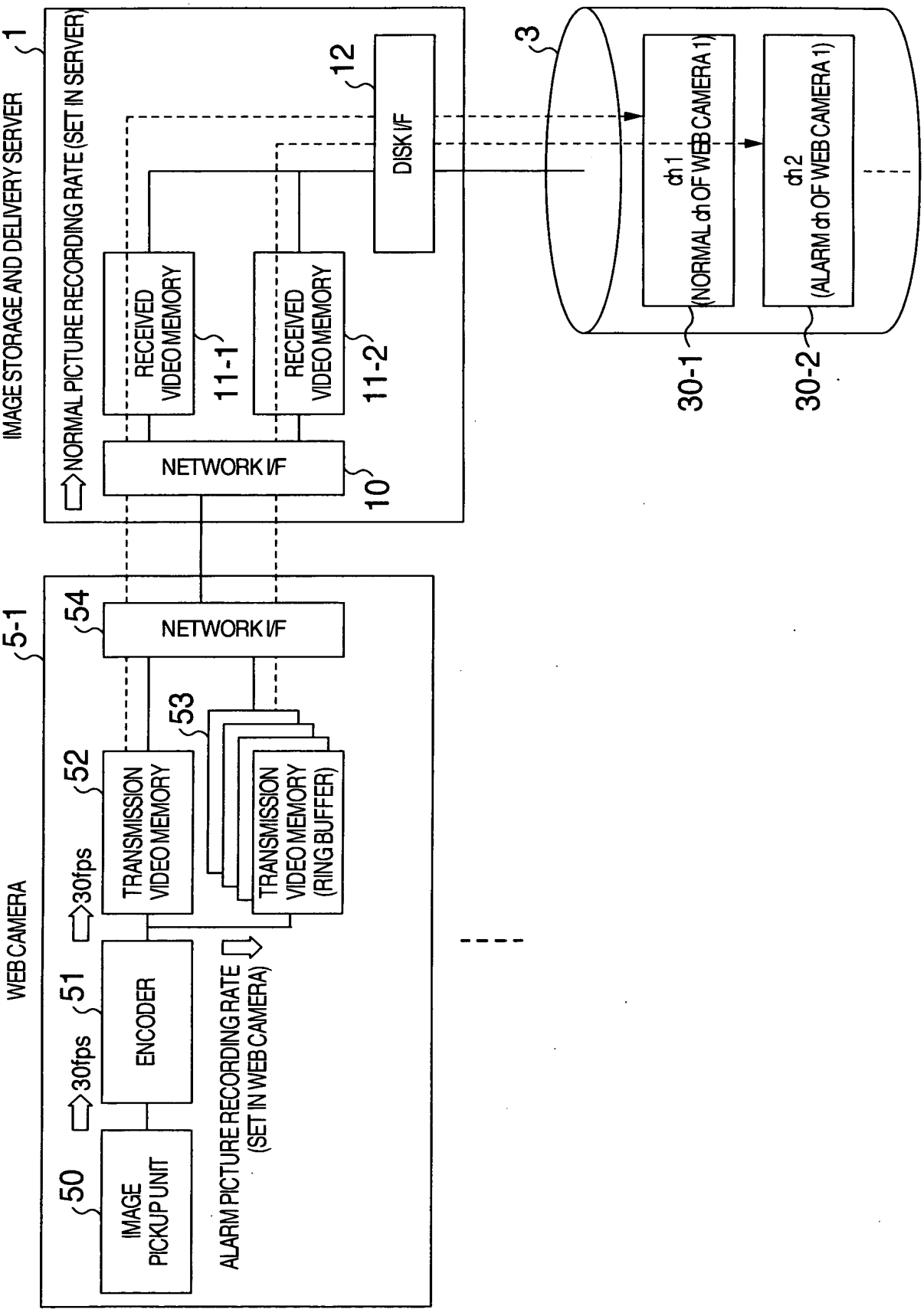


IMAGE STORAGE AND DELIVERY SERVER
1
NORMAL PICTURE RECORDING RATE (SET IN SERVER)
RECEIVED VIDEO MEMORY
11-1
RECEIVED VIDEO MEMORY
11-2
NETWORK I/F
10
DISK I/F
12
3
ch1 (NORMAL ch OF WEB CAMERA 1)
ch2 (ALARM ch OF WEB CAMERA 1)
30-1
30-2
WEB CAMERA
5-1
NETWORK I/F
54
TRANSMISSION VIDEO MEMORY
52
TRANSMISSION VIDEO MEMORY (RING BUFFER)
53
30fps
ENCODER
51
30fps
IMAGE PICKUP UNIT
50
ALARM PICTURE RECORDING RATE (SET IN WEB CAMERA)

FIG. 4

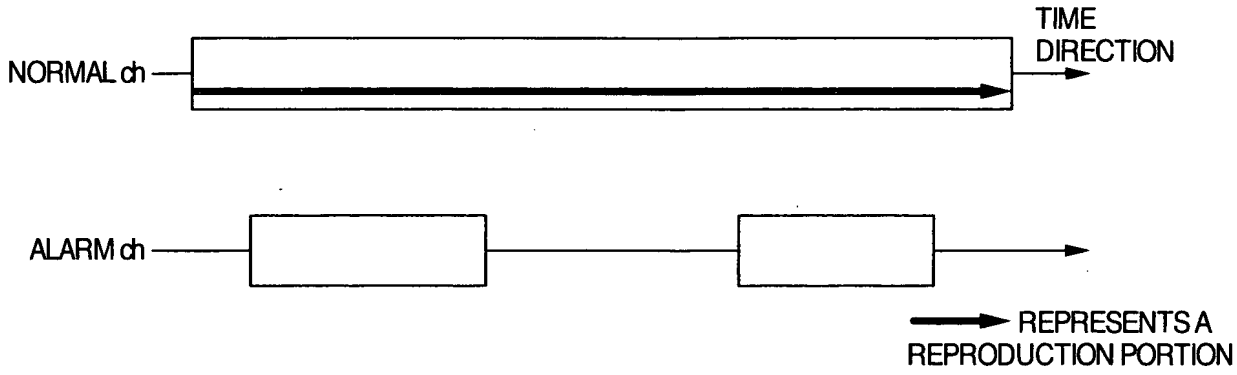


FIG. 5

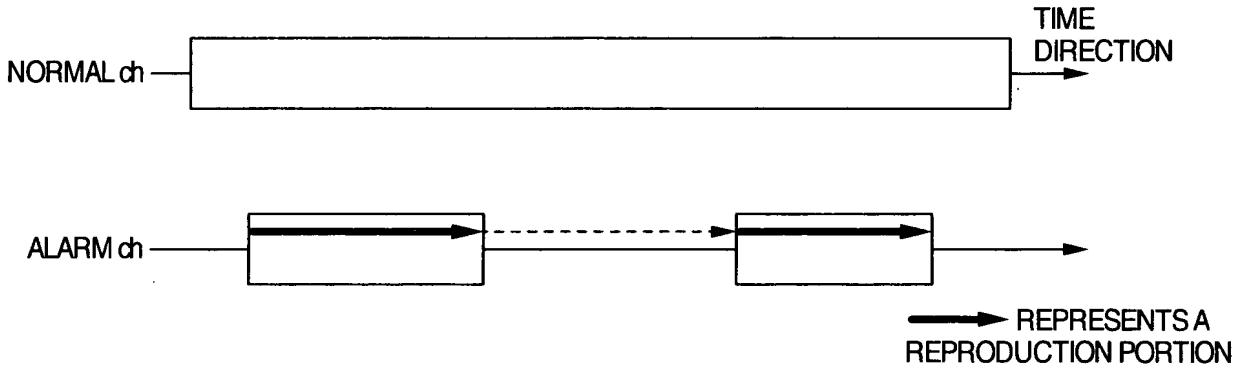


FIG. 6

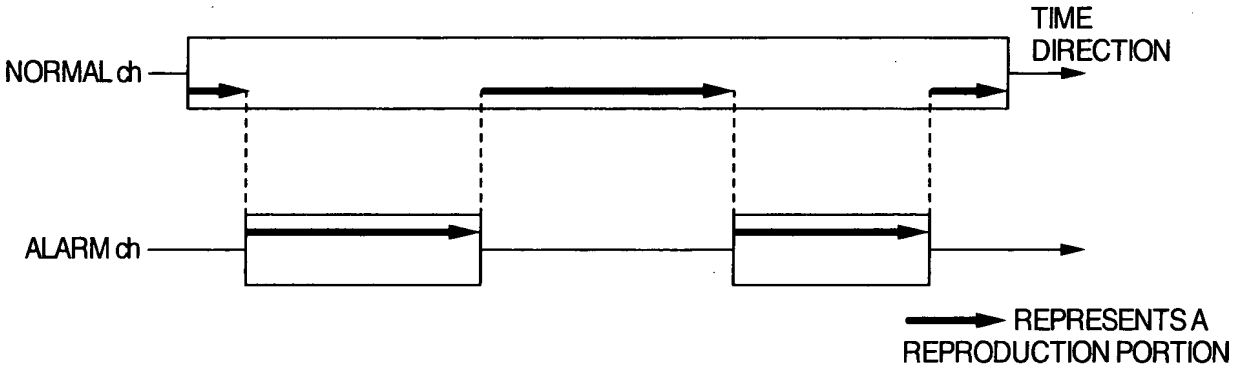


FIG. 7

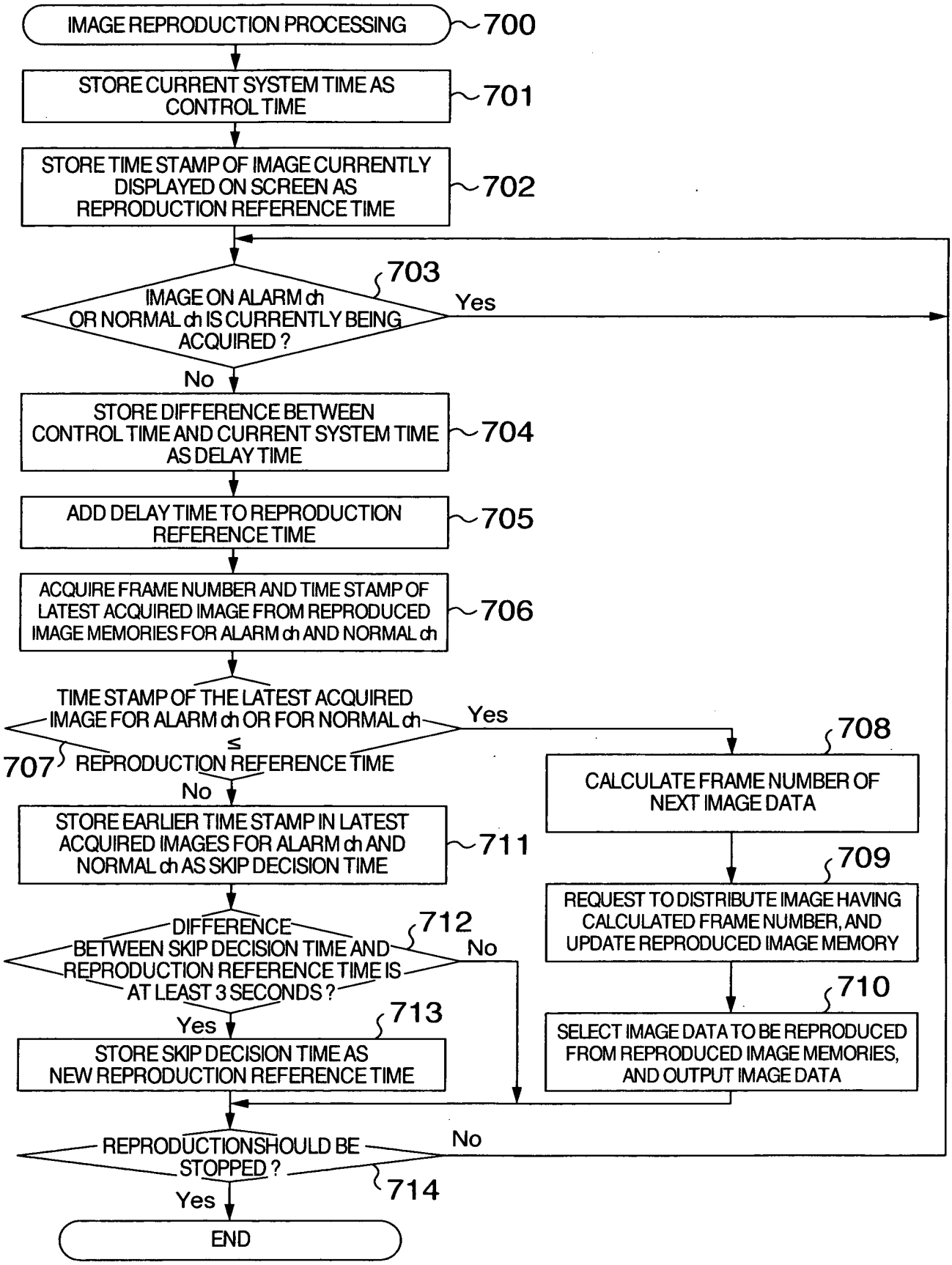


IMAGE REPRODUCTION PROCESSING
700
STORE CURRENT SYSTEM TIME AS CONTROL TIME
701
STORE TIME STAMP OF IMAGE CURRENTLY DISPLAYED ON SCREEN AS REPRODUCTION REFERENCE TIME
702
703
IMAGE ON ALARM ch OR NORMAL ch IS CURRENTLY BEING ACQUIRED ?
Yes
No
STORE DIFFERENCE BETWEEN CONTROL TIME AND CURRENT SYSTEM TIME AS DELAY TIME
704
ADD DELAY TIME TO REPRODUCTION REFERENCE TIME
705
ACQUIRE FRAME NUMBER AND TIME STAMP OF LATEST ACQUIRED IMAGE FROM REPRODUCED IMAGE MEMORIES FOR ALARM ch AND NORMAL ch
706
TIME STAMP OF THE LATEST ACQUIRED IMAGE FOR ALARM ch OR FOR NORMAL ch
≤
REPRODUCTION REFERENCE TIME
707
Yes
No
708
CALCULATE FRAME NUMBER OF NEXT IMAGE DATA
709
REQUEST TO DISTRIBUTE IMAGE HAVING CALCULATED FRAME NUMBER, AND UPDATE REPRODUCED IMAGE MEMORY
710
SELECT IMAGE DATA TO BE REPRODUCED FROM REPRODUCED IMAGE MEMORIES, AND OUTPUT IMAGE DATA
STORE EARLIER TIME STAMP IN LATEST ACQUIRED IMAGES FOR ALARM ch AND NORMAL ch AS SKIP DECISION TIME
711
DIFFERENCE BETWEEN SKIP DECISION TIME AND REPRODUCTION REFERENCE TIME IS AT LEAST 3 SECONDS ?
712
No
Yes
STORE SKIP DECISION TIME AS NEW REPRODUCTION REFERENCE TIME
713
REPRODUCTION SHOULD BE STOPPED ?
No
714
Yes
END

FIG. 8

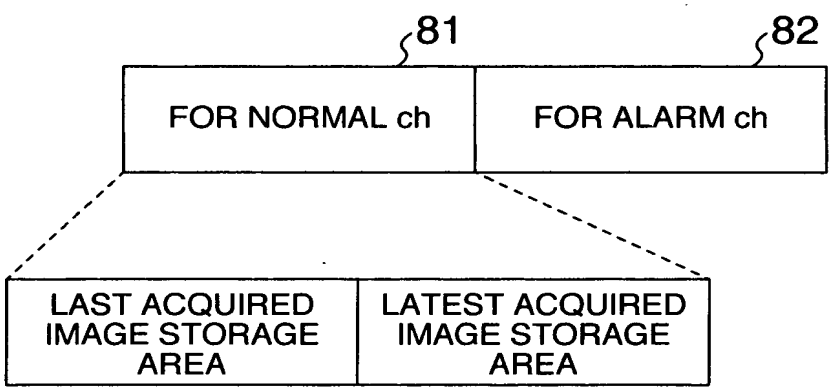

81
82
FOR NORMAL ch
FOR ALARM ch
LAST ACQUIRED IMAGE STORAGE AREA
LATEST ACQUIRED IMAGE STORAGE AREA

FIG. 9

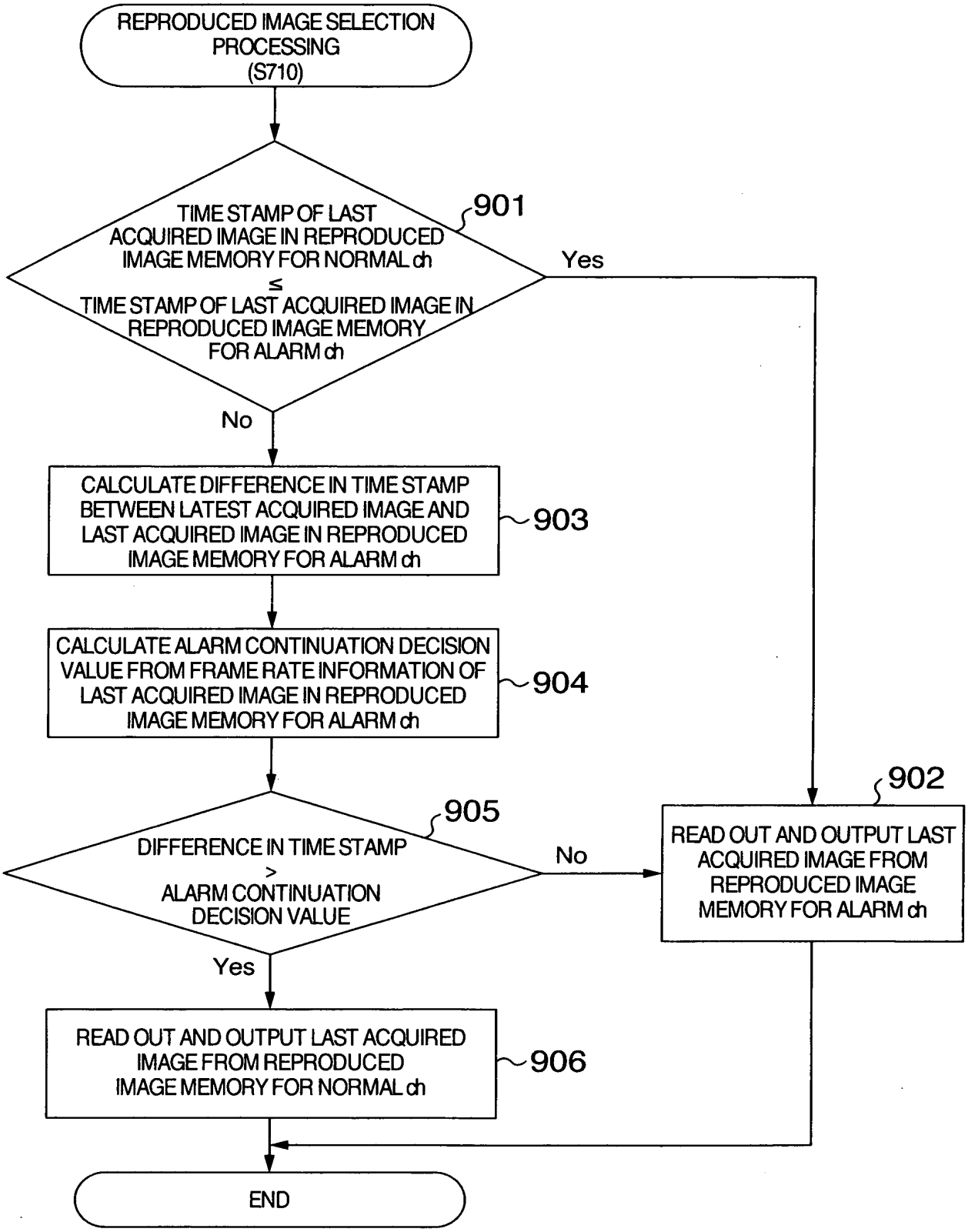
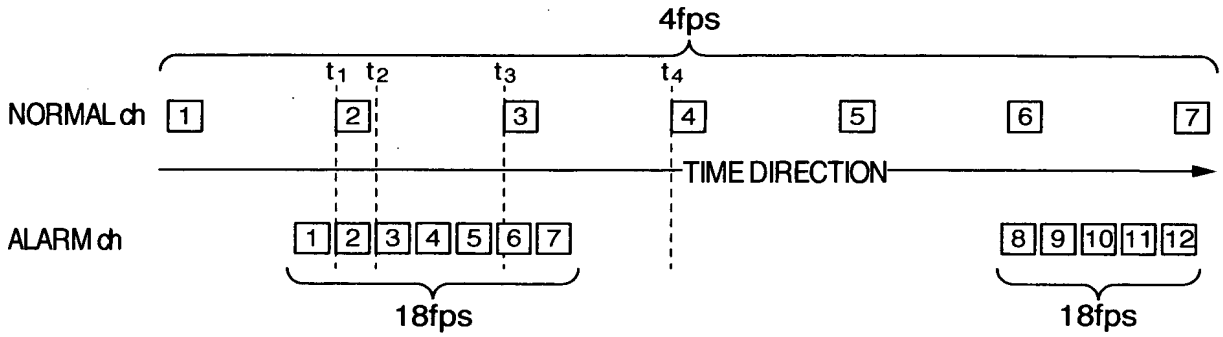
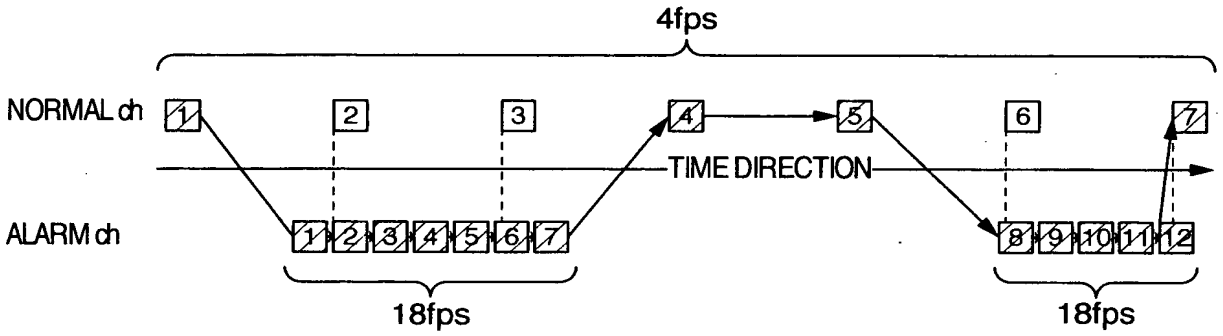

REPRODUCED IMAGE SELECTION PROCESSING (S710)
TIME STAMP OF LAST ACQUIRED IMAGE IN REPRODUCED IMAGE MEMORY FOR NORMAL ch ≤ TIME STAMP OF LAST ACQUIRED IMAGE IN REPRODUCED IMAGE MEMORY FOR ALARM ch
901
Yes
No
CALCULATE DIFFERENCE IN TIME STAMP BETWEEN LATEST ACQUIRED IMAGE AND LAST ACQUIRED IMAGE IN REPRODUCED IMAGE MEMORY FOR ALARM ch
903
CALCULATE ALARM CONTINUATION DECISION VALUE FROM FRAME RATE INFORMATION OF LAST ACQUIRED IMAGE IN REPRODUCED IMAGE MEMORY FOR ALARM ch
904
DIFFERENCE IN TIME STAMP > ALARM CONTINUATION DECISION VALUE
905
No
Yes
READ OUT AND OUTPUT LAST ACQUIRED IMAGE FROM REPRODUCED IMAGE MEMORY FOR ALARM ch
902
READ OUT AND OUTPUT LAST ACQUIRED IMAGE FROM REPRODUCED IMAGE MEMORY FOR NORMAL ch
906
END

FIG. 10A



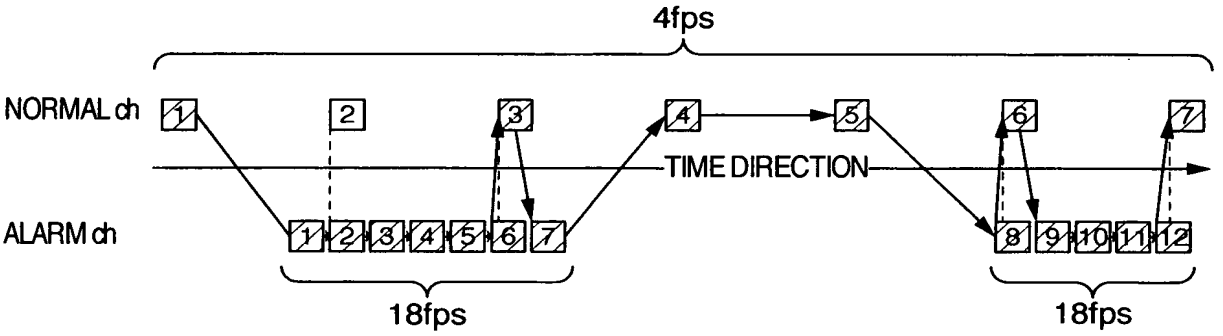
※A NUMERAL IN □ INDICATES A FRAME NUMBER ON EACH ch

FIG. 10B



※A NUMERAL IN □ INDICATES A FRAME NUMBER ON EACH ch
◪ INDICATES A FRAME IMAGE TO BE REPRODUCED

FIG. 10C



※A NUMERAL IN □ INDICATES A FRAME NUMBER ON EACH ch
◪ INDICATES A FRAME IMAGE TO BE REPRODUCED

FIG. 11A

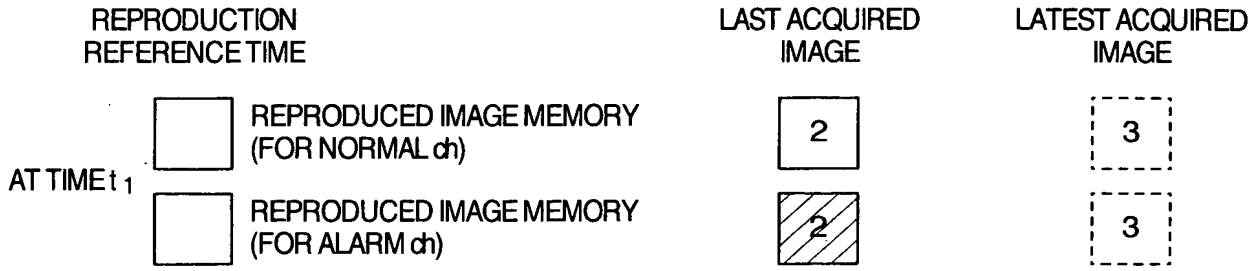


FIG. 11B

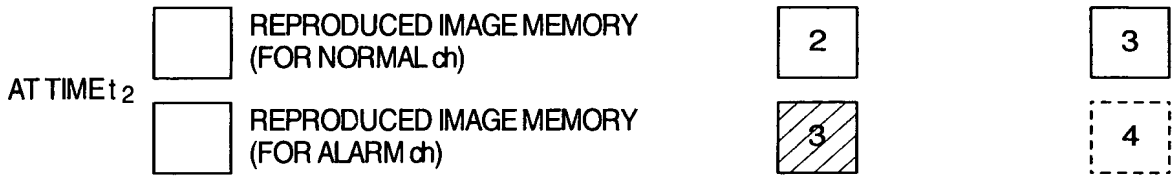


FIG. 11C

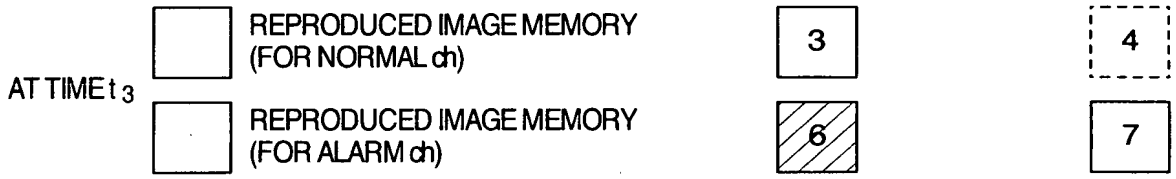
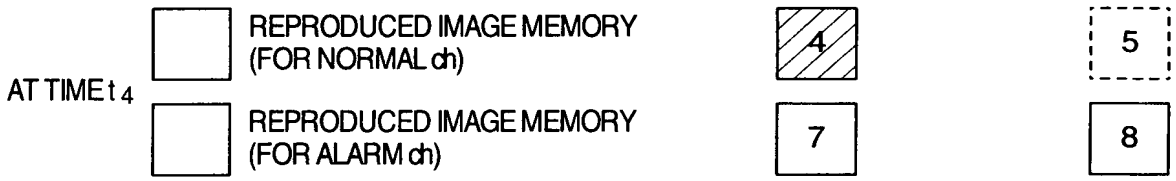


FIG. 11D



※ INDICATES A FRAME IMAGE TO BE REPRODUCED

INDICATES A FRAME IMAGE THAT IS CURRENTLY BEING ACQUIRED

FIG. 12

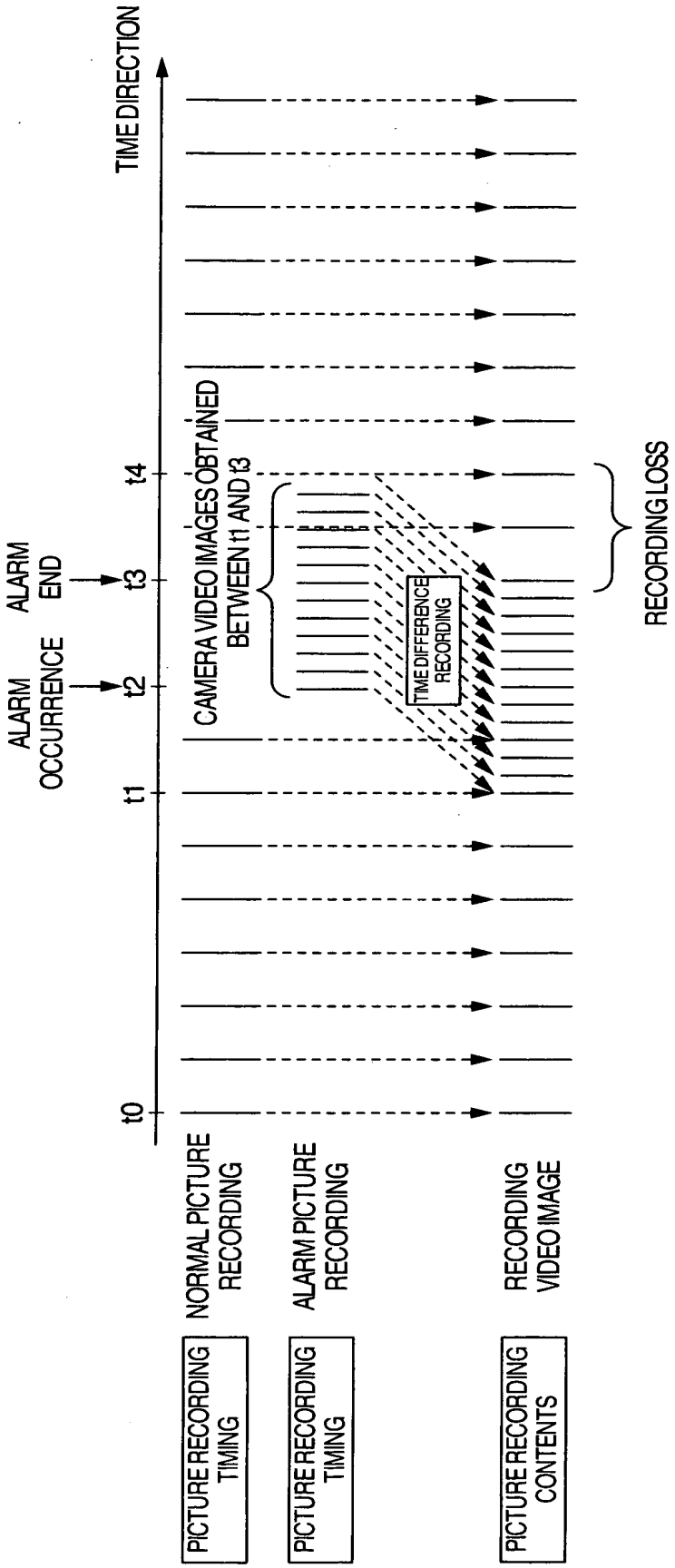

TIME DIRECTION
t0
t1
t2
t3
t4
ALARM OCCURRENCE
ALARM END
CAMERA VIDEO IMAGES OBTAINED BETWEEN t1 AND t3
TIME DIFFERENCE RECORDING
RECORDING LOSS
PICTURE RECORDING TIMING
NORMAL PICTURE RECORDING
PICTURE RECORDING TIMING
ALARM PICTURE RECORDING
PICTURE RECORDING CONTENTS
RECORDING VIDEO IMAGE

FIG. 13

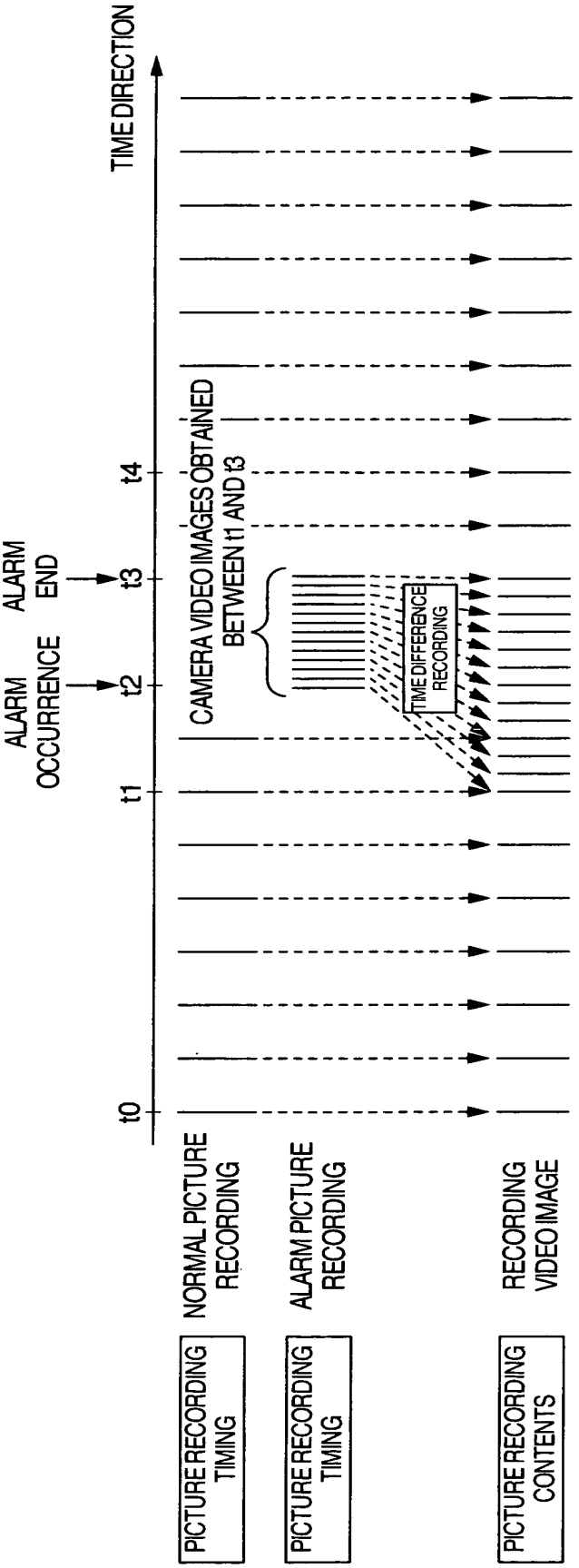

TIME DIRECTION
t0
t1
t2
t3
t4
ALARM OCCURRENCE
ALARM END
CAMERA VIDEO IMAGES OBTAINED BETWEEN t1 AND t3
TIME DIFFERENCE RECORDING
PICTURE RECORDING TIMING
NORMAL PICTURE RECORDING
PICTURE RECORDING TIMING
ALARM PICTURE RECORDING
PICTURE RECORDING CONTENTS
RECORDING VIDEO IMAGE

FIG. 14

ALARM NO.	ALARM PICTURE RECORDING START TIME	ALARM PICTURE RECORDING START FRAME NUMBER	ALARM PICTURE RECORDING END TIME	ALARM PICTURE RECORDING END FRAME NUMBER
1	2004/1/09 23:10:00	1	2004/1/09 23:12:05	7
2	2004/1/10 12:39:00	8	2004/1/10 12:40:30	12
3	—	—	—	—
4	—	—	—	—